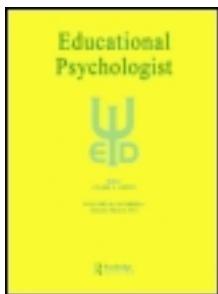


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## Introduction: New Conceptions of Thinking

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What makes thinking good? One need not look far for conceptions of effective thinking: Any modern paperback store offers a cornucopia of counsel. For example, one can find advice on such varied topics as how to be an efficient manager, how to increase one's creativity, how to navigate the stages of aging, how to be one's own best friend, and how to think like a millionaire.

Although the self-help industry has benefited from individuals' interest in their mental self-conduct, schools have taken an interest as well. Especially since the 1970s, a number of schools have implemented programs designed to enhance various aspects of students' thinking and learning. The more prominent programs include CoRT developed by de Bono (1973-1975), which teaches a number of "thinking operations," such as PMI (plus, minus, and interesting features) and CAF (consider all factors); Instrumental Enrichment, developed by Feuerstein (1980), which strives to enhance the cognitive functioning of marginally retarded students; Philosophy for Children (Lipman, Sharp, & Oscanyan, 1980), which cultivates tools of philosophical analysis in ways designed to improve a number of kinds of thinking; and Odyssey (Herrnstein, Nickerson, Sanchez, & Swets, 1989), which includes instruction in strategies for several kinds of thinking, including decision making, problem solving, creative thinking, and categorization and classification.

During this same period, the character of good thinking and learning has attracted the assiduous attention of scholars as well, resulting in several compendia and conferences devoted to the presentation of theory and research related to the development of effective thinking (e.g., Baron & Sternberg, 1986; Chipman, Segal, & Glaser, 1985; Jones & Idol, 1990;

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Nickerson, Perkins, & Smith, 1985; Perkins, Lochhead, & Bishop, 1987; Segal, Chipman, & Glaser, 1985).

These widespread popular and professional initiatives have acquired what must surely be one of the more unfortunate labels of recent times—*thinking skills*. Of the many people active in this field, we know of no one who truly likes this term, and many who loathe it, fearing it seriously misrepresents the complex nature of good thinking and its teaching. Nonetheless, liberally interpreted, the term thinking skills conveys well what the majority of efforts to cultivate thinking have been like. They treat good thinking as composed of a variety of general cognitive processes, such as generating ideas, exploring consequences, reviewing options, monitoring progress, and so on. They adopt the practical approach of offering learners stepwise strategies for such activities and providing plenty of practice, sometimes accompanied by metacognitive reflection. For instance, teaching decision making might involve practicing stepwise strategies to outline the options; looking for further, more creative options; listing pros and cons and synthesizing these into a choice, and then reflecting back on one's own decision-making process.

To some, the teaching of strategies seems artificial. However, research makes it plain that at its best this approach can be truly empowering. Strategic instruction can enhance memory, reading, or math problem solving. For example, Higbee (1977) provided a practical compendium, along with a review of research, for a number of proven tactics for memory enhancement. Studies that reflectively engage students in reading strategies and metacognitive skills show that students can learn to comprehend texts better, as well as monitor their own progress (Palincsar & Brown, 1984). A recent synthesis of a number of efforts to enhance reading show them to be generally successful, with an average effect size of .71 (Haller, Child, & Walberg, 1988). Similarly, the teaching of math problem-solving procedures and control strategies enables students to apply them appropriately to new problems (Schoenfeld, 1985). Volumes examining academic performance and the teaching of strategies have clarified a number of the issues surrounding this approach (e.g., O'Neil, 1978; O'Neil & Spielberger, 1979; Pressley & Brainerd, 1985; Resnick, 1987). In sum, implementation of strategy-based programs in schools can have significant impact on students' learning.

Although such work is encouraging, challenges have arisen. One challenge reflects the contemporary study of expertise (Ericsson & Smith, 1991). Although the thinking skills approach emphasizes general skills and strategies applicable across diverse situations, research on expertise argues that highly local and domain-specific knowledge is what guides sophisticated thinking. Thinking draws on a highly organized, rich knowledge base in the domain in question. A recent outgrowth of this context-oriented perspective

stressing situated learning claims that learning occurs best when situated or embedded in meaningful contexts, rather than when the focus is on discrete cognitive skills and strategies (Brown, Collins, & Duguid, 1989; Lave, 1988; Rogoff, 1990).

Although both the general processes and the expertise views point to important dimensions of cognition, neither seems to present a full picture. This special issue of *Educational Psychologist* explores new conceptions of effective thinking that push beyond both. At the same time, none of the present articles are intended as a direct refutation of either perspective. Rather, the authors identify new dimensions of cognition that invite a more complex, expanded conception of good thinking—one that may include, but is not limited to, general processes and expertise.

In the first article, Olson and Astington argue that the cognitive concepts embedded within language provide children with cognitive structures for interpreting utterances and holding beliefs. In this view, better thinking includes competence with such a set of concepts: Cognitive development is signaled by the acquisition of increasingly rich conceptual categories for thinking about and describing one's own thinking (e.g., knowing when one is making an assumption or a hypothesis). In particular, effective thinking involves the acquisition of concepts needed for thinking about talk (metalinguistic concepts) and thinking about thought (metacognitive concepts).

In the second article, Collins and Ferguson argue for the key role of epistemic forms and epistemic games in good thinking. They claim that a variety of formal explanatory structures guide effective inquiry. These structures are termed *epistemic* because they involve the construction of knowledge. Epistemic forms include axiom systems, stage models, hierarchies, and system-dynamics models, among others. Forms such as these are abstract conceptual structures; using these forms is like playing a kind of complex game because it involves familiarity with a host of rules, constraints, strategies, and moves. One "plays" an epistemic game by satisfying the structural requirements of an epistemic form. Thus, effective inquiry involves both knowledge of several key conceptual structures (epistemic forms) and facility with using them (epistemic games).

Good thinking involves broadband cognitive dispositions as well as specific knowledge and capabilities. In the third article, Langer argues for the importance of what she calls *mindfulness*—an open, probabilistic state of mind that involves the drawing of novel distinctions and the examination of new perspectives. Mindfulness is a nonlinear mental process characterized by cognitive flexibility rather than fixed attention. Langer avers that many traditional attempts to cultivate thinking and learning require the learner to hold information static. But, she argues, without the flexibility that results from mindfulness, premature cognitive commitments tend to

form, and learners mindlessly develop rigid beliefs that reflect a single-minded, noncritical view of the target information.

The fourth article returns to the key role of abstract conceptual structures in thinking. Ohlsson argues that a distinctive characteristic of sophisticated cognition is its ability to go beyond the given and explore aspects of reality that are not immediately present. Such thinking relies on the use of content-free thought forms that Ohlsson calls *abstract schemas*. Like epistemic forms, abstract schemas extract the structure of an inquiry process or pattern, removing it from the particulars of content. Categories of abstract schemas include descriptive schemas (e.g., genealogical trees), explanatory schemas (e.g., Darwinian explanation pattern), and compositional schemas (e.g., atomic models). Ohlsson discusses three such schemas in detail, examining their essential properties and their function in cognition. He argues that abstract schemas are important cognitive tools and should be a target for instruction that cultivates good thinking.

The final article presents a synthesis of several new views of thinking, including the ones put forth in this special issue, and argues for a new, expanded conception of mind. Using the general placeholder term *mindware* for the diverse stuff of good thinking, Perkins, Jay, and Tishman argue that effective thinking occurs when several kinds of mindware coalesce on an occasion of thinking. They compare this coalescence view to the general processes and expertise views mentioned above, focusing on how these three views tell different stories about what good thinking is, how it gets activated, and how it can be taught. The authors also present an enculturation model for teaching thinking that shows how epistemic forms, abstract schemas, dispositions, language, and skills and strategies can all come into play.

We call the views presented in this volume “new conceptions of thinking,” yet we do so with some diffidence. Several of these authors have been writing about these themes for some time, and all of the themes have important historical roots. However, measured by the current climate and emphasis, the articles collected in this volume bring genuinely fresh perspectives to bear on the nature of good thinking and what education can do to cultivate it. The contribution of this special issue rests not so much in supplanting a dominant view, but rather in expanding it by prefiguring new directions in the study and teaching of thinking.

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